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CONSISTENCY CONCEPTS, STRUCTURE AND GEOMETRY OF BEAUTIFICATION COMPOSITION DESIGNS ON THE EXTERNAL WALLS OF MARAGHA RED GUMBEZ (DOME) TOMB

Abstract. In the paper was investigated kinds of building materials used techniques and methods used in the beautification composition, their consistency concepts, structure and geometry of the beautification composition designs on the external walls of Red Dome Tomb built in the period of the Seljuks power. This square shaped building is two-storied. The height of the Tomb is 10 m, the length of the sides is 8.44 m. This quadrangular Tomb built of red bricks was built on the stone foundation with a height of 1.55 meters. The ground floor of the Tomb is located between the stone sidewalks. For the first time during the Islamic architecture of Iran in the beautification compositions on the external walls were used decorative red bricks and turquoise stuccos. In the paper the authour remarked projects implemented on facade of Red Dome Tomb by making geometrical and mathematical calculations with regard to the specificity of beautification compositions futher manifests use of these methods in decoration of mosques, madrassas, minarets, baths, markets and other buildings and beginning the new phase in the history of Islamic architecture of Iran.

Key words: Red Dome, mausoleum, arch, column, half-moon.

Introduction. Maragha Red Gumbez (Dome) Tomb was constructed in the south of Maragha city during Salcuqis reign (1037-1159 years). The dome had been constructed from red brick and this was the main reason of naming it as Red Gunbez. Main construction materials of this Salcuqi dome which is recognized the most ancient tomb of Maragha city consist of stone, brick, sand and grout mixed with drywall. This quadrangular shaped building is two-storeyed. The height of tomb is 10 meters, side length are 8 and 44 meters. This

four-cornered tomb that was constructed from red brick was established on the stone foundation having 1.55 meter height. There is a basement (or hut) of the tomb between the stone pavements and it has not access to the upper floors. Entry of the basement (hut) is on the east side of the building. Entry door of the 1st floor of the tomb is on the north side. Its 5 stone steps are in front of the tomb and 2 steps are on the threshold of gunbez room. Turquoise color glazed tiles were laid among the red bricks on the external walls of the tomb [1].

Red brick and turquoise color glazed tiles were used in making geometric carves. Round shape columns, especially, decorative compositions made by red brick and turquoise glazed tiles on the north part of the tomb are of utmost beautiful and exceptional art worth.

The interpretation of the main material. Red Gunbez (Dome) Tomb shows the beginning of an important stage in the architectural history of Islamic Iran. This new stage was the beginning of decorating the exterior walls of buildings with glazed tile. Decorating the exterior walls of buildings with glazed tile is of great importance. Furthermore, the first mausoleum that the exterior walls was designed from glazed tile in architectural history of Iran was the Red Gunbez (Dome) Tomb. The advantage of this decoration composition is that patterns on the red brick were made of blue and turquoise color glazed tiles. The exterior walls of Red Gunbez (Dome) Tomb were also decorated from convex drywall (gypsum). Walls' constructing from brick and decorating with different geometric shapes gives special beauty to the tomb. Columns in this tomb were decorated with diverse geometric patterns. Entry door of the building made from beautiful and symmetric arch and patterns, engravings were made on its frame and sides were decorated with Kufic Katibas. There is another Kufic Katiba on the door crescent. Decorating the main door of the tomb with blue glazed tiles, brick patterns, fine drywall patterns, Kufic Katibas made from brick and different engravings give an intrinsic beauty to the building. (3) Thus, turquoise colour glazed tiles were decorated over the red brick base. There lines on the drywall (gypsum) base, geometric patterns made from red brick and engraving decorations were made on it.

Round columns made from brick were decorated from brick and turquoise glazed tiles on the edges of the tomb, especially, very precise fine decoration on the green stone heads in the north corners gives indispensable beauty to the building. Except the abovementioned advantages, decorative compositions that worked from geometric figures makes façade exceptionally beautiful.

The consistent research on the structure of the decorative compositions, decorative designs of the exterior walls of the building shows that engrave were made in very precise geometric measures [3]. In addition, the abovementioned applied advantages are of exceptional importance in decoration of the external façade of the building. Therefore, consistency concepts, structure and geometry of decorative composition designs of external walls of the building are investigated in this article [7].



Picture 1. Building north façade



Picture 2. Building 3 parameters façade

2 types of decorative compositions were worked on external walls of the Red Dome tomb which has great geometric importance.

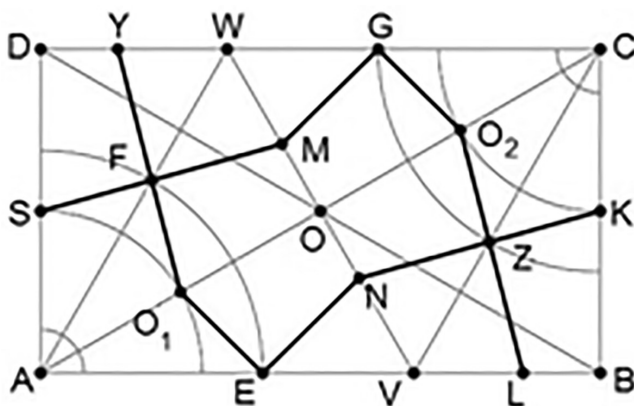
1. Geometric patterns of tağnuma (arch form) part of the entry door.
2. Geometric patterns of kerchief (shawl form) part of the main entry door of the building [2].

Structure and geometry of decorative composition designs of tağnuma (arch form) part on the entry door.



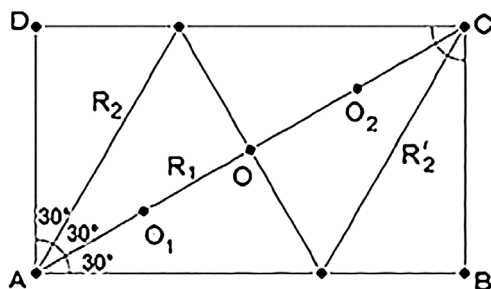
Picture 3. Geometric design of tağnuma (arch form) part on the entry door.

This decoration design is a geometric knot design being of six and “təblişol” knot type. During geometric designing of this knot, we assume AB width of any plot of land for the first time (Sketch 1). Perpendicular line is drawn from A point to AB line. A angle is divided into 3 equal parts and R1 and R2 radiuses are drawn. Crossing R1 radius with the line that drawn perpendicular from B point to AB line makes C point. Parallel line is drawn from C point to AB line and its crossing with a perpendicular line that drawn from A point to AB line makes D point. Thus, we get “zamına” (base) of ABCD knot [5].



Sketch 1

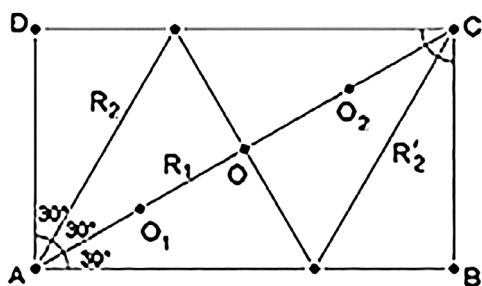
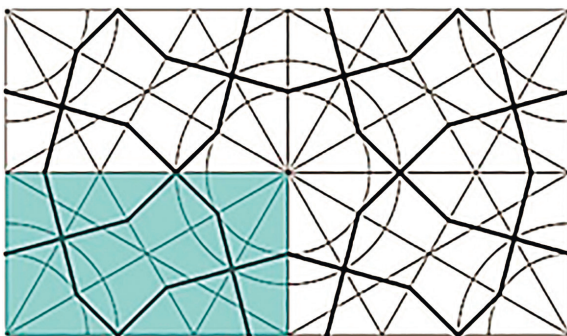
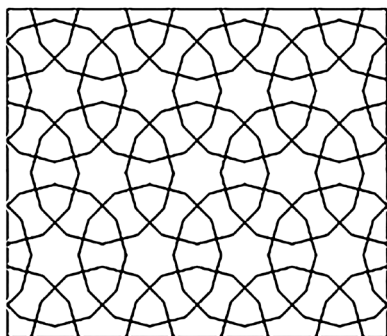
AC diameter is divided into 4 parts in this sketch and we get O, O₁ and O₂ points. In the second sketch one “Kaman” (bow shape) is drawn with AO₁ radius in the A centre and also, another Kaman is drawn with any radius. Also, one Kaman is drawn with CO₂ and CG radius and we get M point from crossing of O₁



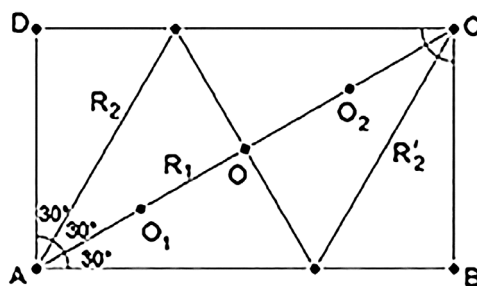
Sketch 2

point to E point, F point to S point and lengthening SF line and crossing with WV line. Y point is got from lengthening and crossing of O₁F line with DC line. Thus, EO₁FMGO₂ZN “təbl tool” and SFO₁E... hexagonal (hexangular) tool (shape) and other tools (shapes) are obtained from crossing of points. One part of decorative knot is established as a result [5].

As in the sketch 2, wider knot “zamina” can be made consisting of several knots by placing 4 decorative knot parts parallel and correspondingly, by pacing six complete knots with “table sol” (name of decorative knot) (sketch 3).



Sketch 3



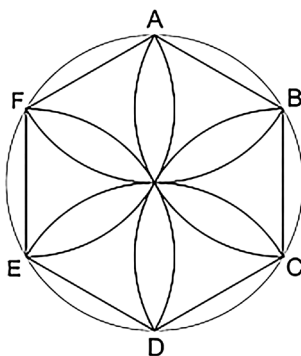
Sketch 4

Structure and geometry of design applied in the north kerchief (name of decorative shape) of the Red Gunbez (Dome) Tomb [6].

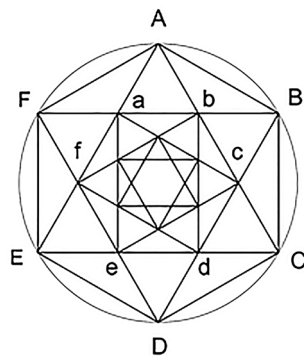


**Picture 4. Geometric design of kerchief
(name of decorative shape on the main entry door)**

Geometry of this knot is made on the basis of dividing the circle. According to the Sketch 5 any circle is drawn in the first step. Then the area of circle is divided into six parts and ABCDEF hexagonal is placed on the area of circle.

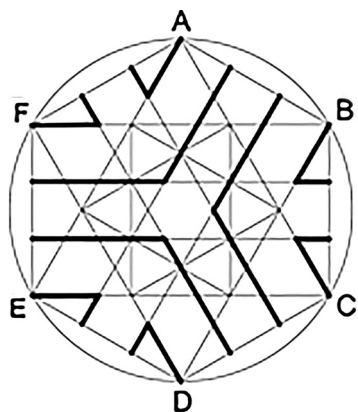


Sketch 5

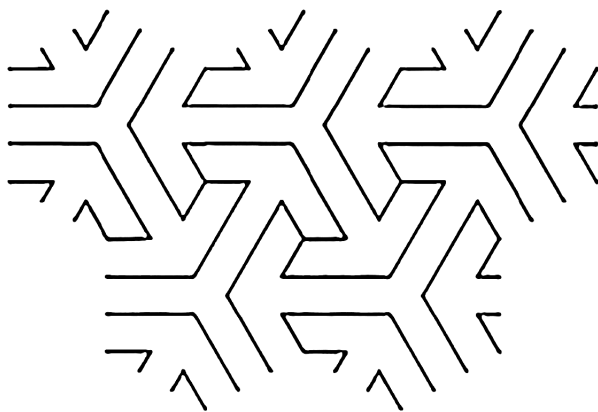


Sketch 6

In the second step, angles of hexagonal are connected to each other (like connecting A point to C). ABCDEF hexagonal is got from connecting these lines as a result. Another hexagonal or hexangular is formed as a result of connecting these hexagonal angles. In the third step, each side of ABCDEF hexagonal is divided into 3 equal parts and points are obtained as per the Sketch. Six sides (parallel sides) are connected to each other. Lengthening of lines and connecting them causes a knot in the forth step [7].



Sketch 7



Sketch 8

Repeating perfect (complete) knot causes bigger “zamina” according to the Sketch 8.

Conclusion. Using geometric designs and forms that applied in the façade of the Red Gunbez (Dome) Tomb, using multicomponent construction materials for the first time like brick, glazed tile by geometric methods and styles over the external surface of façade of this building, shaving the bricks, its being of the same component with glazed tile caused forming of rich arched and decorative designs over the external surfaces of this building. These decorative designs and methods were then used in the buildings of mosques, minarets, madrasa, hamams(bath), bazaars and others. The main reason of unequalledness, magnificence and beauty of these architectural designs on the façade of these buildings was balanced correlation of forms and volume components, also, taking into account the proportion and correlation of decorative layers over the buildings external surfaces, construction materials as well as brick and glazed tiles.

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*Əhməd Pənəhi (İran)***Marağa Qırmızı Günbəz Türbəsinin xarici divarlarında bəzək kompozisiya tərtibatının ardıcılıq prinsipi, strukturu və həndəsi quruluşu**

Məqalədə Səlcuqilərin hakimiyyəti dövründə tikilmiş Qırmızı günbəz məqbərəsinin xarici divarlarındakı bəzək kompozisiyaları layihələrinin ardıcılıq prinsipləri, onların struktur quruluşu, həndəsəsi, bəzək kompozisiyalarında işlədilən tikinti materiallarının növləri və işlənmə üsul və metodları tədqiq olunmuşdur. Kvadrat şəkilli bu bina ikimərtəbəlidir. Məqbərənin hündürlüyü 10 metr, tərəflərinin uzunluğu 8, 44 metrdir. Qırmızı rəngli kərpicdən tikilmiş dördguşəli bu məqbərə 1.55 metr hündürlüyü olan daş özül üzərində inşa edilmişdir. Daş səkilərin arasında məqbərənin alt mərtəbəsi (və ya daxması) yerləşmişdir. İranın İslam memarlığı tarixində ilk dəfə olaraq xarici divarların bəzək kompozisiyalar dekorativ qırmızı kərpicdən və firuzə rəngli kaşılardan istifadə olunmuşdur. Müəllif məqalədə Qırmızı günbəz məqbərəsinin fasadında tətbiq olunan layihələri həndəsi və riyazi hesablamalar aparmaqla şərh edərək bəzək kompozisiyalarının bənzərsizliyininəzərə çatdırmaqla sonralar məscidlərin, mədrəsələrin, minarələrin, hamamların, bazarların və s.

binaların bəzədilməsində bu üsulların tətbiq olunmasını və İran İslam memarlığı tarixində yeni mərhələnin başlandığını göstərir.

Açar sözlər: Qırmızı gümbəz, mavzoley, tağ, sütun, aypara.

Ахмед Панахи (Иран)

**Принцип последовательности композиционного оформления,
структура и геометрия украшения внешних стен мавзолея
Красный купол в Мараге**

В статье исследуются принципы последовательности проектов орнаментальных композиций, их структурное устройство, геометрия, виды строительных материалов, используемых в орнаментальных композициях, а также способы и методы их обработки на внешних стенах мавзолея Красный Купол, построенного в период правления Сельджуков. Квадратное здание представляет собой двухэтажное строение. Высота гробницы составляет 10 метров, длина сторон - 8,44 метра. Построенная из красного кирпича, четырехугольная гробница возвышается на каменном фундаменте высотой 1,55 метра. Нижний этаж гробницы (либо подвал) располагается между каменными тротуарами. Впервые в истории иранской исламской архитектуры для орнаментальных композиций наружных стен использовались декоративные красные кирпичи и бирюзовые камни. В статье автор, разъясняя проекты, выполненные на фасаде мавзолея Красный купол с помощью геометрических и математических расчетов, подчеркивая уникальность орнаментальных композиций, указывает на применение в последующие времена данных способов в отделке мечетей, медресе, минаретов, бань, рынков и других зданий, и, соответственно, на начало нового этапа в иранской исламской архитектуре.

Ключевые слова: Красный купол, мавзолей, арка, колонна, полумесяц.

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SHAPE-BUILDING ELEMENTS OF THE TURKISH STYLE IN THE INTERIOR

Abstract. The authentic, “refined” elements of the Turkish style in the interior and exterior are studied in the article. The emphasis is laid on the so-called “alphabet” of artistic language, the delineation of the Turkish interior inherent characteristics. Identification of the “Turkri” style sources of inspirations makes it possible to characterize the peculiarities of the interior design in the Turkish style, performed by the European designers. The concepts of the “Turkri” style and the Turkish style are also considered in the article. Special attention is focused on the identification of authentic primary elements, ethnic and cultural characteristics that are peculiar to the ethnic interior in the Turkish style. Therefore, the choice of our research line is caused by a modern specialist long-felt need for information, which would be gathered into a whole entity functioning as an alphabet of style and could facilitate searching and processing of information for creating modern stylizations based on the study of authentic features of the Turkish architecture, arts and design.

Keywords: the “Turkri” style, interior design, “alphabet” of artistic language, primary elements, ethno-cultural features.

Introduction. The Turkish style has been popular in Europe since the Middle ages due to a variety of reasons. The Ottoman Empire was distinguished by its own exotic architecture especially by the mosques, palaces with harems and domes, bazaars, caravan-serais, gardens and fountains that are able to surprise and amaze people’s perception with their geometric symmetry, ideal forms, precise and clear lines of compositional solutions, luxury decoration of secular and sacred architecture.

Modern Turkey is a multinational state where customs and traditions of nomadic peoples, the Turks and the Arabs, united by the canons of Islam,